The Northwestern MILLER

MILLING PRODUCTION SECTION

Air Conditioning in Flour Mills

By Leo Walter

Consulting Engineer
England

First, what is air conditioning? Briefly, it is controlled treatment of air, supplied to a building, which air has been:

(a) Cleaned in air filters.

(b) Preheated or pre-cooled in coils, supplied with a heating medium (hot water, steam) or cooled (by means of chilled water, brine, Freon, etc.).

(c) Cleaned and heated or cooled in an air washer, consisting of a chamber with water sprays.

(d) Reheated or cooled in main coils, similar to (b).

(e) Distributed by means of a fan and air ducts.

Fig. 1 shows, diagrammatically, the layout of a typical central air conditioning plant. The diagram shows a simple form of (central air conditioning) plant, which works as follows: Fresh outside air is mixed with recirculated air from the conditioned space and cleaned in an air filter (F). Heater battery (A) preheats the air, which is then cleaned, and cooled or heated up by means of water sprays in an air washer chamber (B). The air is then freed from droplets of water in scrubber and eliminator plates (C), and is reheated in main heater battery (D). A slowly moving fan, usually motor-driven, blows the treated air into supply air duct (E), and distribution air ducts, preferably equipped with air diffuser outlets, convey the treated air to each part of the building.

Combined temperature and humidity control is performed by using the so-called "dewpoint method" by means of steam control valve (1) in the steam supply pipe to preheater battery (A), actuated from immersion thermostat (3). The reheater battery is similarly controlled by valve (2) and thermostat (4). As mentioned before, much more elaborate layouts are possible.

This combination of filter, surface heaters or coolers, water sprays, and auxiliary sections of dirt eliminators, air volume dampers and large low speed air fan has to be calculated according to the volume and quality of the fresh incoming air, and according to the special treatment which the air undergoes within the apparatus.

Of utmost importance is the use of automatic controllers for operating valves to heater or cooling coils, of air dampers for mixing, throttling or diverting the air, etc. Proper air treatment for producing the desired temperature and humidity conditions can only be achieved by accurate control of the plant, preferably by automatic means. (Fig. 1A).

It may be of interest to the progressive flour miller to know that under average conditions for every sack of flour milled about a ton and a half of air is brought into intimate contact with the small flour particles. From a hygienic point of view, this indicates at once that contaminated air is unsuitable for the milling process, because the small porous flour particles, with their humid warm surfaces, are a good breeding place for bacteria and spores in untreated air. There are also dust and dirt present in air, and where a flour mill is near places where soot from factory chimneys or dust from heavily frequented roads can contaminate the air, air cleaning becomes important.

One means of cleaning larger quantities of dust air is to subject the air stream at low volocity to finely divided water sprays. By breaking up and atomizing water, good contact is made between the minute droplets and the air. A new development is the so-called capillary air washer, which acts as air cleaner and dust arrester on a novel principle. This type of equipment departs from the practice of using large quantities of water in fine mist form to produce intimate contact between air and water sprays. More efficient contact is achieved by dividing both the water and the air into fine streams flowing together through low resistance channels. (Fig. 2).

The basic element of the capillary conditioner is the capillary cell. Each cell consists of a standard casing 20 in. x 20 in. in face dimensions and 8 in. in depth. The entire cell casing is filled with fine glass filaments. Through the 8-in. depth of the cell these filaments are arranged essentially parallel to the direction of air flow through the cell.

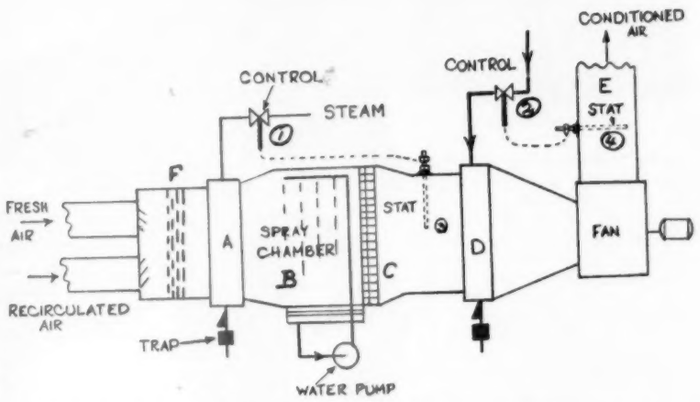

FIG. 1.—Simplified arrangement of central air conditioning plant.

In operation, liquid is distributed by low pressure nozzles over the upper face of the cell, from which point it flows along the thousands of oriented strands by gravity to the lower face, where it accumulates until large drops are formed which fall to the collecting tank below. This characteristic prevents entrainment of minute droplets in the air stream and permits the use of simple low resistant eliminators. Liquid and air always flow parallel to one another in either concurrent or counter current relationship.

The dust and spore removal performance of the capillary cell ranks with the best dry and viscous type filters. In practice, the cells remove in excess of 95% by weight of the air-borne solid matter which includes virtually all particles exceeding 5 microns in size and most of those down to 1 micron.

The advisability of using air free from bacteria and spores is obvious for hygienic reasons for flour mills. Air treatment is, however, also advisable for other reasons, and another point to be considered is that untreated air might alter the physical and chemical nature of the small flour particles, influence moisture content and evaporation of the latter, and affect millability.

The practical miller konws, of course, that great air volumes are required in the course of milling for purification by means of air currents, but the figure 1¼ tons of air per sack of flour might be less known.

One of the the reasons why temperature control of air is important is the need to remove some of the heat generated during the milling process. Controlled air temperature improves sifting, keeping qualities and baking value. Variation of air temperature during milling can cause brittleness, influences reduction and separation and affect sifting capacities of the silk cloth. Air currents at not only correct air temperature but also of desirable air humidity will have the required drying effect on the material.

The practical application of automatic damper control may show how humidity control is performed in practice. Fig. 3 shows a diagram of an air conditioned drying or storage space, with recirculated air. Fresh air from outside can be mixed with the returned air, and the mixture is then treated in the previously described way in an air washer chamber, or in a complete central air conditioning plant. A by-pass air duct with air damper enables direct return of the recirculated air without going through the conditioning plant. This by-pass air damper can now be automatically operated from a damper motor, actuated from a humidity controller.

(Continued on page 21a)

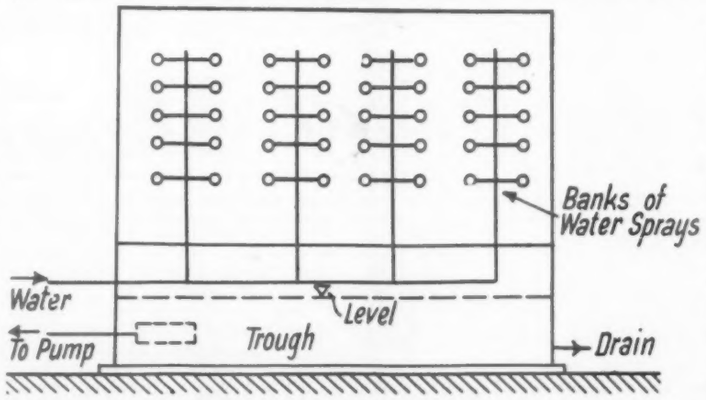

FIG. 1A—Diagrammatic layout of air washer.

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The AOM and the Milling Industry

By Willard H. Meinecke

The past year has been a good year for the Association of Operative Millers, with the accomplishments, efforts and attainments completed during the year. I am sure that each one of us appreciates the fine cooperation and service rendered to the industry and to the association by our people within the AOM group.

Don Eber, serving the association in the capacity of executive secretary, has given yeoman service throughout the past year and previous years. He has worked hard, he has spent long hours and time in following his chosen profession and his first love. Very few meetings has he missed. We appreciate the fine service he has rendered to our association and to the milling industry.

We appreciate further the fine spirit of good will extended to us by our fellow associations, such as the American Association of Cereal Chemists and the Millers National Federation, as well as other organizations within the milling and allied industries. We particularly want to extend our appreciation for the support given us by the associate members of the AOM. The fine attention our superiors or management has given to us is commendable.

It has been a great pleasure for me to serve in the capacity of the office you bestowed on me a year ago. I thoroughly appreciate your fine spirit and cooperation.

All districts have reported active participation in meetings held during the past year. Many worthwhile subjects with thought-provoking speakers have passed before the attention of millers throughout the U.S.

District Activities

Officers elected have been of high calibre, and the fine attendance and participation speak well for their planning and attention. Your international officers extend sincere thanks for activities such as:

(1) Holding active meetings during the year.

(2) Conducting essay contests.

(3) Support of the AOM correspondence course.

(4) Holding bolter-grinder forums.

(5) Conducting topic conferences.

(6) Participating in active committees such as (a) sanitation, (b) technical, (c) educational.

(7) Serving as speakers for allied groups.

(8) Contributing to the technical bulletin service.

(9) Running commercial milling tests on a collaborative basis.

In retrospect mention should be made of the continued progress of AOM meetings held—attendance interest, new faces, content of meeting agenda. The meetings have been most enlightening—yes, helpful to our companies and to ourselves.

As the doctor becomes cognizant of the powers of a new drug, such as penicillin, so too does the miller gather the experience of others and by work application fills his storehouse of knowledge.

As operative millers at the helm of grain conversion and processing, we carry the responsibility of making our actions and accomplishments known for the love of our chosen profession, for the management of our companies, and for the people we serve, the public.

Transient action which still meets the economic dictates of our times is a required necessity. New ideas, developments, lower cost operations and improved quality products must constantly and vigorously receive the full-time efforts of our energy and imagination.

During the past year each meeting group was exposed to the responsibilities a member of the AOM has toward his profession, the responsibilities and duties of a district, and the duties and responsibilities of district officers. Each in his own right has a definite place in this team of professional millers.

I hope that by talking about it, by re-emphasizing, that the stature of millers has improved somewhat. The question, however, still stands: What is each of us going to contribute to our profession, to our company, to our individual districts, to the international AOM in the coming days, years, decades. The AOM must positively continue to sell itself as a profession to top management, to the milling industry, to other professions in industry, to future millers, by performance, by action, by improvement, by open minds.

Something New

The milling industry needs big men —men who can lift this business from its doddering stage to something new, something invigorating. The horizon ought to be bright, but we only have to read the utterances of our own industry people to know something is wrong. Are we waiting for atomic propulsion? Are we unable to sparkplug that new idea? Have we been dreaming in a world of pushbuttons, yet unable to bring forth a fresh idea to accompilsh our objectives?

Somewhere in this industry, somewhere in this AOM group, must be that genius, that fellow who can and will resolve a simple idea into practical revolutionary utilization. Then most of us will probably sit back and wonder why didn't we think of it or do it first.

It's strange how the apathy of men occurs. Why do we wait for George to start first? Do we lack imagination, initiative, interest?

We say our industry is doddering because we simply are not satisfied with our results — performances. Why?

When we compare our technological advance with other industries, we rate not at the top. Apparently we are content. We keep saying, however, we can't afford any major changes because of economics. A poor excuse, indeed. We must necessarily challenge ourselves to find the means, to find the solution, to exert energy toward that end rather than reducing the desire to improve.

The milling industry—and the feed industry, which allies itself with the staff of life—should take its proper place among industries as a leader. We can be in that class only by pulling on the boot straps. Not just the technical millers, but presidents, boards of directors and others as a team.

A Challenge

All of us as operative millers challenge our management to give us the wherewithal, the skilled management, proper financing, and leadership of outstanding quality. In return we must move to something new and come up with that 1% improvement in conversion or other improvement factors which will basically improve the performance of our mill responsibilities. Can our times develop an Oliver Evans, a La Croix?

With the need for new ideas and development, what greater challenge can be extended to our educational people? What greater encouragement can be given to our youth entering the industry? Our problems are alive. Where are the people to make them really come to life? Come out of your obscured sanctuary, we say.

We note with discouragement the recent happenings within our industry where mills have been closed down, other mills going by the wayside because of financial reverses,

Willard H. Meinecke

and all of the other bad news which normally hits the front page of any paper. However, there has recently been some reason to be optimistic. But this is one of the most interesting times to live in. I wouldn't trade it for any other era in our historical background. It is an era in which we have been challenging ourselves within and from without to do something that will basically change our philosophy of doing busi-

(Continued on page 21a)

EDITOR'S NOTE: The accompanying article is from the address by Willard H. Meinecke, retiring president of the Association of Operative Millers, at the AOM's 1954 Technical Conference. Mr. Meinecke, who is General Mills, Inc., plant superintendent at Tacoma, Wash., reviews AOM activities and progress. At the same time he cites figures showing a decline in productivity of cereal processing plants since 1939, and he calls attention to the need for technological advancement in the milling industry. He urges continued efforts in seeking significant and important new improvements.

Proper Concrete Maintenance Preserves, Protects Elevators

By T. D. McLeod

Western Waterproofing Co., Inc.
Kansas City

In these days of high construction costs, a concrete elevator or mill building is a very valuable piece of property that is worth careful maintenance. It is an established fact that preventive maintenance pays on concrete structures, just as it does on mechanical equipment. Often these structures are "taken for granted" since they do not have any moving parts and one does not think in terms of constant vigilance regarding maintenance. However, every day the weather takes its toll, and it behooves one to carefully inspect these surfaces at regular intervals.

What are the tell-tale signs that indicate that maintenance is needed? The first sign that usually appears is the cracking of the concrete. Then actual spalling of various sections of the concrete takes place, exposing reinforcing bars, followed by leakage and structural weakening. Of course, the sooner these deficiencies are detected and remedied, the more economical the solution, and the less damage to the structure.

What type of maintenance is necessary for concrete structures? The cellular nature of the concrete causes it to absorb water by capillary attraction. This moisture reaches the reinforcing bars and they rust and expand. The steel creates extreme pressure as it expands and causes the

REPAIRING DAMAGE — Before treating concrete so that it will be waterproof it is necessary to repair any damage, such as cracks and spalling. As shown above, the decayed parts of the elevator structure are cut away and then filled in. This is done with pneumatic tools to do the cutting and a cement gun to do the patch work.

concrete to spall and crack. In addition, the freezing and thawing action breaks down the cells of the concrete, causing disintegration. Moisture being the common factor in concrete deterioration, proper maintenance of concrete would indicate that we treat the concrete to make it moisture resistant.

What type of treatment should be used to keep the moisture away from the concrete? At first, it would seem reasonable to paint the concrete with an impervious type oil base or asphalt base paint. However, experience has dictated that using an impervious type of paint sets up a condensation reaction within the concrete walls. As a cool drink on a summer day will cause moisture to appear on the exterior of the glass, so will moisture condense within a wall where the wall has been treated with an impervious seal. Hence, the treatment of the concrete should be "wall breathing" type and not an impervious seal.

"Wall Breathing"

What is "wall breathing?" It is nothing more than allowing the passage of air and vapor through the pores of the material in a natural fashion. Can this be done, and still prevent water from seeping through the same pores that allow breathing? Yes, it can. The surface tension of a drop of water may be kept from penetrating a pore, providing the pores of the surface are small enough. Portland cement is sifted through a very fine screen (100 mesh). A screen of this type will actually hold water, although vapor can readily pass through.

Hence, this indicates that the proper protection of concrete to prevent liquid water from passing through and still not set up condensation within the walls, is a wall breathing grout that densifies the concrete surface. This grout must also eliminate capillary attraction and have the same coefficient of expansion and contraction as concrete. A cement-based grout with the proper gradation of aggregate, treated so it will not support capillary attraction, is the proper material with which to densify concrete. It answers all the requirements: Wall breathing—same expansion and contraction—will not support capillary attraction.

Of course, in addition, any damage to the structure, such as cracks and spalling, must first be remedied in the same manner as a dentist would fill a tooth; that is, the decayed portion is cut away and then filled in. This is best done by means of pneumatic tools to do the cutting and cement gun to do the patch work.

To entrust the job of maintaining your structures to incompetent engineers and workmen is very costly, although at the time the work is originally done, it may seem more economical. One of the most knotty problems faced by elevator owners and operators today is how to remove heavy, thick coatings that have failed, in order that the job may be done correctly. The cost of removing these coatings sometimes exceeds three and four times the cost of putting them on. Hence, be careful.

This type of maintenance is a job for skilled mechanics. Not only does the work take the knowledge of an experienced concrete man, but also the hazard of working in the air demands even additional skill. Select a contractor who has had plenty of experience in concrete work. It will pay.

—BREAD IS THE STAFF OF LIFE—

Pillow Blocks and Hangers Are Drive Necessities

Bearings are an essential part of the mechanical transmission of power, whether it be direct connection or the modern group drive system. All bearings must be supported properly and substantially, and because of this, various types of support known as pillow blocks and hangers have been developed. The former is generally used for head shafts and individual driving and the latter for line-, counter-, and jack-shafting of the modern group drive system.

The term "pillow block" has become another name for "bearing," but in reality it is a housing for the bearing. The solid or split journal box is practically the only type where the bearing and housing are integral. Bearings of this character are either babbitted or bronze- or brass-bushed and are lubricated by means of compression grease cups, bottle oilers, or hand application.

Until a few years ago the most widely used bearing for head-shafting and individual driving was the self-oiling rigid pillow block since it possessed many advantages over the common journal bearing such as shaft capacity up to 12 in. diam., sturdiness, large bearing area, positive method of lubrication, ample oil reservoir, good grade of babbitt and dustproofing.

Although these pillow blocks are termed "rigid," their rigidity is not positive since the babbitt liner has a slight lateral movement. When bearings of this character are used adjacent to heavy gearing, clutches and pulleys, the "turned liner" type should be used. This type of self-

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oiling rigid pillow block is positively rigid and can be adjusted horizontally by slotted bolt holes in its base. Automatic lubrication is accomplished by the ring method. When both horizontal and vertical adjustment is required, a wedge type base plate can be used. The rigid ring-oiling pillow block can be furnished with housing split at either 30 or 45 degrees.

Another Pillow Block

Another pillow block for general line-, jack-, and counter-shaft service up to 4 15/16 in. shaft diameter is the adjustable ball and socket type since in addition to the desirable ball and socket connection of the bearing in the frame, it possesses the advantage of vertical adjustment of the bearing without the use of the adjustable base plate. The ball and socket design of these bearings permits adjustment for a small amount of shaft bending and angular misalignment between bearings.

By inverting the frame these pillow blocks can be used as "short drop" shaft hangers. It is not advisable to use this type of bearing and support on heavily loaded shafting such as the first shaft from the prime mover. The rigid pillow block with base plate should be employed for such locations.

Regardless of the good qualities of the cast iron rigid ring-oiling pillow block the trend during the past few years for this type of bearing service has been toward the ball and roller bearing pillow block. The development in pillow blocks of this character has kept pace with the advancing requirements of industrial operations since they reduce friction load to a minimum, are self-lubricating, and are positively rigid. Their first cost is slightly higher than the rigid ring-oiling babbitted box but the increased investment is soon amortized by their general efficiency. One of the largest manufacturers of all types of pillow blocks and bearings states, "Our old reliable rigid ring-oiling pillow blocks have been almost entirely supplanted by anti-friction bearings."

At the present time the ball or roller bearing pillow block is preferred and generally selected wherever their relatively higher cost can be justified by longer life, lower bearing losses, and reduced maintenance. They are available in both rigid and self-aligning construction and can be adapted to any type of shaft by tapered adapter sleeves or by locking collars and set screws. They are sealed against dirt and other contaminants.

As a rule the ball and roller bearing pillow block is cast iron, however recently there has appeared on the market an all-steel roller bearing pillow block which possesses certain advantages over the cast iron block.

Recent Designs

Although there still is a certain demand for better babbitted bearing pillow blocks, manufacturers of bearings are constantly seeking improvement in this class of bearing. Two of the most recent designs are the "sleeve-oil" and "bronze-oil" pillow blocks. The "sleeve-oil" pillow block is suitable for a wide range of industrial applications where a precision built babbitted bearing, which is self-aligning and quiet in operation, is required. These bearings are manufactured up to 8 in. shaft diameter and can be furnished in either plain or water-cooled types. These pillow blocks are especially adaptable for fan and blower service since they incorporate features of design to meet the exacting requirements of this industry.

The "bronze-oil" pillow block represents an important advance in a bearing for small diameter, high-speed shafting up to 1 3/16 in. The capillary bronze bushing used has a capacity of one third its volume in oil, and the large oil reservoir, with close-fitting wick which surrounds the bushing, insures unfailing lubrication.

Choice of the type of pillow blocks is governed by a number of factors, size and speed of the shaft being first considerations. The amount and type of the load to be carried are important. Atmospheric and mechanical conditions must be considered; likewise, accessibility and provisions for making adjustments for misalignments, expansion, or wear. Space limitations, first costs, replacement costs, ease of replacement, and servicing facilities must all be considered.

Primarily, pillow blocks are designed by the manufacturers to be capable of handling the loads that would be carried normally by shafting of the given diameter. Abnormal loads, such as high belt pulls or heavy flywheels, may have to be considered.

Proper Alignment

To facilitate the proper alignment of pillow blocks, base plates are available with provisions for adjustment in one or two directions. Base plates are also available for use with floor stands. Wall bracket supports can be used when the pillow blocks must be carried some distance from a wall to provide clearance for pulleys, gears, etc. For supporting pil-

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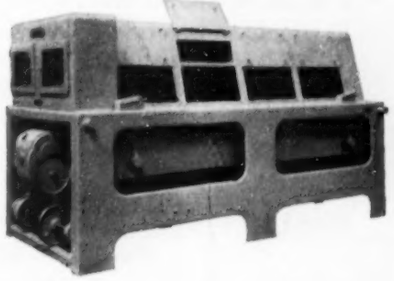

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low blocks from the ceiling a sling-type hanger, with two-way adjustment, can be employed. If a shaft must operate through a wall a base plate of the two-way adjustment type can be used with a steel arch wall box frame, the arch serving to support the masonry or brickwork around the opening made in the wall. If the wall is not to be used for a support the masonry around the opening for the shaft can be supported by a thimble. Usually thimbles are of the split type and are made of cast iron or sheet steel. When carefully installed, thimbles not only support the masonry but they set up barriers to the passage of fumes, fire or dirt.

Cast iron or steel drop hangers for line-, counter- and jack-shafting are always necessary where the modern group system of power transmission is employed. There are two types: the ball and socket (or two-point suspension) and the four-point suspension. Of recent years the four-point suspension has been most in demand. These four-point hangers have adjusting screws which provide a vertical adjustment of 2 in. and a horizontal adjustment of ¾ in. These frames will accommodate ring-oiling babbitted bearings and roller or ball bearings up to shaft diameters of 3 15/16 in.

Shaft hangers are designed for use on ceilings, wall brackets and floor with various means of adjustment. To avoid stripping the shaft of pulleys and other accessories when removing it from the hanger, some types have an opening on one side of the structure.

In view of the variety of shaft hangers available, careful consideration should be given to selection in an effort to minimize losses in power and to secure the lowest possible costs of operation and maintenance. —**From the Power Transmission Council Bulletin.**

——BREAD IS THE STAFF OF LIFE——

Change Announced in Grain Moisture Chart

WASHINGTON—A revised conversion chart for use with the Tag-Heppenstall electric moisture meter in determining the moisture in white wheat grown in the eastern areas of the U.S. has been announced by the U.S. Department of Agriculture. The chart will be used by licensed grain inspectors and grain inspection supervisors beginning July 1, 1954.

The official grain standards provide that the moisture content of wheat shall be that ascertained by the air oven and the method of using this oven described in Service and Regulatory Announcements No. 147, or by any device and method which give equivalent results. The use of the air oven is not practical in the routine inspection of grain, USDA says, and electric moisture testers which give results equivalent to the air-oven method are commonly used.

The department is continually appraising the accuracy of the conversion charts which are used in determining moisture. It has been found that certain changes in the Tag-Heppenstall chart for white wheat of eastern production are desirable in order to bring it in line with the official air-oven method in testing wheat now being grown. The use of the revised chart will show slightly higher moisture results than the chart now being used. The conversion chart for soft read winter wheat and for white wheat (eastern production), effective July 1, 1951, will be applicable only to soft red winter wheat after June 30, 1954.

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EVALUATION OF PERSONNEL

• • •

By Ray E. Rowland

My subject, evaluation of personnel and training, as a sub-head of the general subject, "People and Profits", suggests that people and profits are closely linked together. In my opinion, not only are they closely linked together, but for the most part, profits are a direct result of good management, and management is people.

I like to think of the personnel of a company as the third dimension of the picture. You can look at a financial statement; you see the assets and the liabilities, the profit for the year or period; but back of these dollars and cents is the most important asset, the personnel—not buildings, machinery or money. The biggest limiting factor of most business firms is personnel. The personnel determines whether the business goes forward, stands still, or goes backward—putting it another way, they determine whether we "stay on course" or drift.

Our big job in management is how to evaluate or reward our people in the future as our business firm grows. People are responsible for the growth and success of a business. If that weren't true, all we would have to have would be a building, capital and clerks.

If we are going to have and keep capable people, we must have a well administered compensation plan. If that plan is well administered, we must have some kind of an evaluation program for our personnel. Evaluation runs concurrently with a good compensation plan.

There is no question that this country has produced many successful business leaders in the past without any formal evaluation on training programs. Very able men with tremendous drive largely took care of their own development.

Evaluation was largely a matter of looking at results without too much regard for the manner in which results were obtained. At levels below that of top management, personal whims and fancies and hunches frequently took the place of seasoned and deliberate evaluations.

When it became necessary to fill an opening at any level, there was employed what might be called the "crisis" method of selection. Evaluation had to be accomplished in a very short period of time so that the replacement could be selected and the business go on.

The increasing role of government, technological developments, the influence of international relations, and the rise of labor unions have made the task of conducting a business more difficult and exacting than it ever was before. Native ability, hard work, judgment, personality and high ambition are still very important ingredients in business success, but many business leaders have seen fit to question whether these factors are adequate enough by themselves to furnish industry with a sufficient supply of skilled personnel at all levels and in all departments.

Continuous Process

This is particularly true of companies which are expanding rapidly. Evaluation of personnel, both in terms of current performance and future potential, must be a continuous process. In the case of our own com-

EDITOR'S NOTE: In the accompanying article, Ray E. Rowland, vice president of the Ralston Purina Co., St. Louis, presents some valuable information on the evaluation and training of personnel. People are responsible for the growth and success of a business, he points out, and the big job in management is how to evaluate and reward people. Mr. Rowland also stresses the importance of training. He covers various factors in the evaluation and handling of personnel, including analysis of the organization, performance standards, incentive pay, salary reviews, management meetings, determination of employees' potential, employee progress reviews, executive training. This article is from a talk by Mr. Rowland at the American Feed Manufacturers Assn. convention.

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pany, we believe that this process is the most important single function which management at all levels has to perform day by day. Personally, I spend more time discussing evaluation of personnel than I do any other phase of my job. Get the right man at the helm and the ship will keep on course.

We are fully convinced that unless we carry on an effective and thorough analysis of our organization and take the action made necessary by that analysis, not only will we stymie future growth, but company performance at current sales and production levels will suffer. There is an increasing need to pool the best thinking in the company in order to ear-mark those individuals who are doing a superior job currently as well as those who seem to have the capacity to do a bigger job tomorrow.

Results still furnish the most important single yardstick of rating as individual in terms of either current performance or growth potential. We can use the finest rating forms, psychological tests, interviews, and other evaluation techniques that can be developed, but if we are honest we have to admit that we can't deny the facts, the results. It is in the interpretation and analysis of results that difficulty frequently arises. We need to set fair goals or quotas, define standards of performance, etc., against which individual results can be measured.

Standards of Performance

I would like to ask the question, "Have you set goals, quotas, standards of performance, in all departments of your business?"

For example, in the sales field there are questions not merely of tons sold, but new dealers secured, number of open markets, group selling meetings, number of key feeders, etc. Do you have an incentive program for your salesmen? What is there in it for him if he does a plus job?

In the production field we are concerned not only with the profitability of a given operation, but also with cost per ton, man-hours per ton, formula variation, ingredient shrinks, employee morale, development of people by individual managers, department heads, foremen, etc.

Do you have a bonus system or an incentive for the manager, superintendent or foreman or a sliding salary scale to compensate a superintendent who manufactures feed for 1 man hour per ton as compared to the superintendent who manufactured feed for 1.5 man hour per ton?

Thus, not only can individual results be measured by well-defined standards, but it is also possible to place individuals in situations which give them an opportunity to achieve results, and in turn give management an opportunity to appraise potential. This can be accomplished by judicious job rotation, the use of understudies, special assignments, membership on regular or special committees, and participation in community activities.

Yardsticks

In Purina we believe that we have found it possible to develop well-defined yardsticks based on study and experience by which to gauge the performance of any particular unit of the company and as a corollary matter the contribution of any individual within that unit. In addition, we have made a conscious effort to place individuals in situations which challenge their resourcefulness, imagination, industry, and judgment.

A salary review, of course, furnishes an excellent opportunity to discuss the qualities of individual employees. We use this occasion not only to consider salary adjustments, but also to explore the next step. "Where does he go from here?" "How far can he go?" "How far away is he?" "How does he compare with others in the organization?" I believe in a semi-annual salary review.

In the production department we hold a monthly meeting of division production managers to discuss where we have been and where we are going. We find that a large part of our discussion revolves about organization. Months in advance of the opening of any new plant a pool of names is developed for each key position, and these are reviewed again and again at subsequent meetings.

We also have an annual management inventory for all production facilities as of Jan. 1. We ask each plant manager to complete a form which indicates which office and mill employees have the potential to develop along certain lines within the next five years. In other words, the plant manager, drawing upon his own personal observation as well as that of other members of his staff, suggests certain people for consideration as plant managers, superintendents, department heads, and foremen.

These forms are routed to the particular division production manager who indicates his own concurrence or disagreement with the recommendations and then distributes them to officers directly concerned with production. These furnish the basis for further discussions both at the central office level and at the plant level on the occasion of various trips that staff and line management people make periodically.

Check List

In estimating the capacity of individuals for growth and promotion, there are a number of careful questions which can be used as a checklist as follows:

a. What original contribution has been made for a company, plant, or department benefit beyond normal re-

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quirements of position? Specify new methods or ideas personally initiated and effected.

b. State in order of importance at least three of his most outstanding abilities or qualifications.

c. State in order of importance at least three abilities or qualifications in which he may need development with respect to his present position.

d. Briefly outline what he has been doing to improve himself in his present position and to prepare for possible advancement.

e. Is he utilizing his highest abilities in the field in which he is now?

f. Is his performance deteriorating? Remaining the same? Or improving?

g. Does he direct people and activities without destroying initiative?

h. Does he have the confidence of subordinates? Associates? Superiors?

i. Does he promote teamwork and job interest?

j. Is he resourceful in handling multiple and non-routine problems?

Evaluation of personnel is, of course, a broad subject and covers a great deal more than salary review or rating for growth potential. There can be regular and periodic rating of hourly employees.

For example, we regularly review the progress of new hourly and clerical employees at various plants. This is usually on a basis of a 30-day, 60-day, and 90-day review. Decision is made at each date as to retention in employment, and the employee is advised about his progress.

Annual Review

At a few plants we are also experimenting with an annual review for all hourly employees in the mill. The superintendent sits down with each employee and discusses with him in a friendly manner his progress, problems, ambitions and work record. Where this program has been carefully handled so as not to break down morale, it has proven to be very beneficial. Employees seem to welcome the recognition given them and the opportunity to express their thoughts ment has followed too frequently the and feelings.

High morale of employees is not an accident. It is the result of someone in management spending a lot of time counseling — informing the employee of what is going on. In other words, making them feel they belong and are a part of management.

Any program, whether formal or informal, of evaluating personnel should include provision for discussion with the individual employee.

I suppose that in the past manage- counseling and coaching may well policy of telling employees nothing and keeping them on their toes. How many times have we told a 20- or 25-year employee for the first time that he has been a failure for many years? The separation interview has been all too often the only progress report the employee ever had.

While individual counseling and coaching are important at all levels, those who have made a study of executive development feel that this ing.

furnish one of the most important single tools of executive training. We can't help but recognize, of course, that not all members of line management have the disposition or skill to do an effective job of counseling. In other words, frequently the trainers need training. It is necessary for top management to recognize any inadequacies along these lines and to assist lower levels of management in doing a better job of constructive counsel-

Each trainee is told that at the end

Periodic evaluation of employees is a must if you have a training program. We have had a very intensive training program since 1946 or the close of World War II. We have hired 106 trainees (our terminology for a college graduate) for office and mill. We have 89 of these same trainees remaining as of April 1. (17 of these trainees are superintendents today, 3 are managers, and others are in key jobs.)

of a year we expect to know whether or not he is qualified to remain with our organization, and that he should determine in his own mind if he wants to stay with us.

I have been asked by many business executives, "Where do you get your men to staff your new plants?". Without an intensive training and evaluation program, our expansion would not have been possible.

——BREAD IS THE STAFF OF LIFE——

Vitamin Group Named

NEW YORK—To provide standardization in the vitamin assay of foods in various countries and thus to facilitate international trade, a Vitamin Commission has been organized under the auspices of the food division of the International Union of Pure and Applied Chemistry with Prof. E. Brunius, of the National Public Health Institute, Stockholm, Sweden, as chairman. The additional members are:

Dr. W. F. G. Cuthbertson, Glaxo Laboratories, Ltd., England; Dr. Max Kofler, F. Hoffmann La Roche and Co., Ltd., Switzerland; Dr. Bernard L. Oser, Food Research Laboratories, Inc., U.S., and Dr. Henri Simonnet, National Veterinary School, Alfort and National Agronomic Institute, France.

The commission will explore vitamin procedures specifically adapted to food products entering into international commerce.

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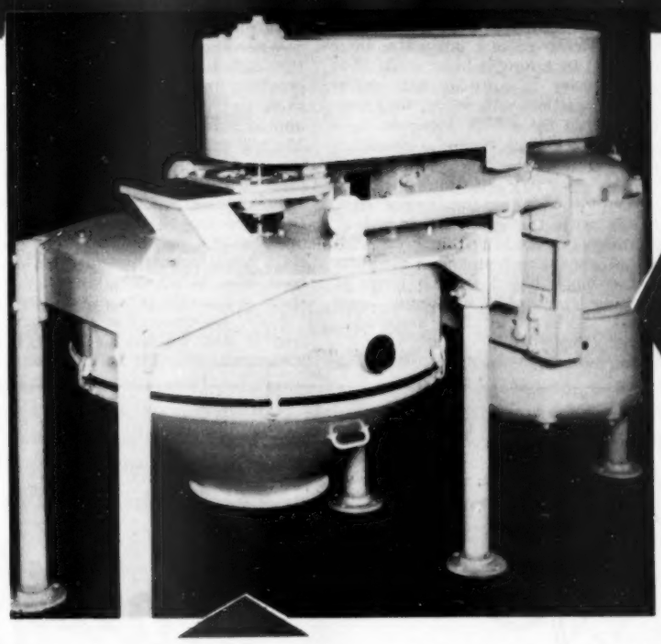

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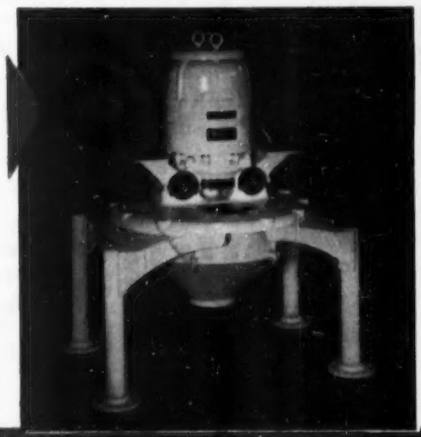

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How You Can Reduce Bagging Costs

By Arthur J. Burke
Richardson Scale Co.

There are various ways in which a processor may be losing money in his bagging operations. Here are five of them:

1. Weight "Give-Away": Weights-and-measures regulations and often customer goodwill make it necessary for a processor to set the mean weight on his bagging scale higher than the nominal weight. Thus, no bag falls short in weight. The mean weight or scale setting consequently is above the nominal weight by the amount of the maximum weight variation, resulting in a give-away of material practically in every bag.

For old, sluggish and poorly maintained scales the weight variation may be considerable. Losses may be especially high when bagging at high speed or bagging an expensive commodity. For instance, in bagging a commodity worth $0.10/lb. at a rate of 12 bags/min., even a 4-oz. give-away costs $18/hr. In bagging a chemical worth $0.25/lb. at a rate of 4 bags/min., a 4 oz. give-away would cost $15/hr. (Figs. 1 and 2.)

2. Excess Labor Costs: It costs $3,500 to $4,500 per year in process plants for one bagging operator. The amount includes miscellaneous benefits. Using the higher figure, labor costs for one- and two-man bagging systems are charted for the full range of speeds. (Fig. 3.)

Some installations require additional labor. Standby labor, for instance, may run as high as 20 to 33⅓% of ordinary labor cost. Maintenance may require one extra hour of labor in an eight-hour shift. If it is necessary to consider both maintenance and standby labor, they may be covered by a 50% increase.

3. Wrong Bag (bagging operation referred to throughout is applicable to bag sizes of 50-lb. and up): Bag cost, like weighing-inaccuracy cost, varies with the speed of operation. At high speeds, it takes on real significance. For instance, a medium-priced cloth bag 1 in. too large at bagging rates of 4 bags/min. costs about $2/hr.; at 20 bags/min., $9/hr. (Fig. 4.)

Bag cost depends, too, on type and size. Types might be considered as open-mouth (paper, cotton and burlap), and valve. Remember that changes in bag size are not uniform. Size changes, for example, in paper may be in width as well as length. In cotton and burlap, size changes generally are in circumference or length. These lengths are standardized pretty much at 30, 31, 36, 37 and 40 in.

How much more expensive is the valve bag? A valve bag performing a given bagging operation may be smaller than the open-mouth bag required to perform the same operation, because there is no extra material required for the handling and closing of the valve bag. Yet, the valve bag will usually cost more for the given operation. For example, two typical fertilizer bag sizes are: a 14½x3½x30½ in. valve bag and a 15x3½x32 in. open-mouth paper bag. The valve bag costs $0.005 more than the open-mouth bag and the tape, thread and cotton filler cord used to close it.

For flour and feeds, however, the bag sizes are the same or the valve bags might even be larger.

When the same sizes are compared, the difference in cost is naturally greater. For example, a 15x5x30 in. valve bag (4 ply 3-60 and 1-50) costs approximately $0.01 more than a 15x5x30 in. open-mouth bag, of similar construction, and the material used to close it.

When the difference in cost for the same bag size is $0.01, there is over a $50 savings per eight-hour shift when operating at rates of 20 bags/min. When bagging at 6/min. there is a saving of about $8 per day.

Note, however, the difference in cost is less when smaller bags are compared. Reason: In the range of smaller sizes, open-mouth bags come with extra material on top to facilitate closing.

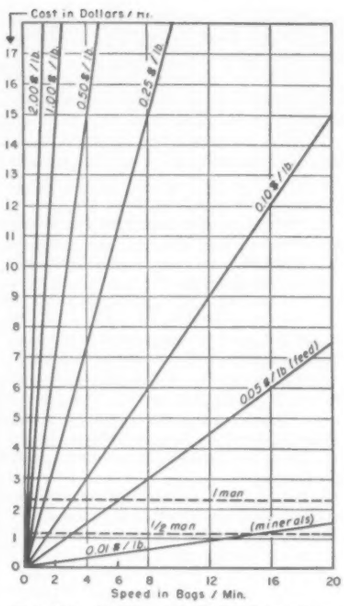

Fig.1 Material Give-Away Cost for 2-oz. Accuracy

How expensive are small changes in bag size? Slight difference in paper bag size, such as a 1 in. change in either length or width, involves in many cases such a small difference in cost that it may not be significant. But a 1 in. change for cloth bags costs from $0.005/bag and up, which is substantial.

4. Improper Amortization: A nationally known process company amortizes its equipment in three years. In doing so it makes allow-

EDITOR'S NOTE: The author of the accompanying article, Arthur J. Burke, is chief engineer for the Richardson Scale Co., Clifton, N.J. In this article, Mr. Burke outlines five ways in which manufacturers and processors may be losing money in their bagging operations. He also explains five possible ways to cut bagging costs. Mr. Burke, a graduate of Newark College of Engineering, has been studying problems of weighing and bagging materials with Richardson Scale for the past 18 years.

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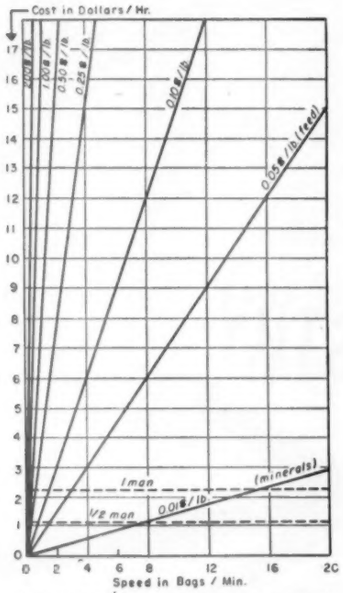

Fig. 2 Material Give-Away Cost for 4-oz. Accuracy

ances for federal excess profits tax, considering the 52% tax possibility.

How much could this company afford to spend on equipment that would eliminate one man from a bagging operation? Figuring the cost again of one operator as $4,500 per year, the cost under a three-year amortization amounts to $13,500. Under the 52% tax, a $6,500 investment is in order.

A company, however, may find it desirable to streamline an operation in preparation for a highly competitive period in spite of current profit incentive. By and large, most processors change their feeling toward amortization with the business outlook, just as most people change their attitude toward investments with the business outlook.

5. Figuring Interest: Interest as a cost of operating a bagging installation generally can be overlooked. Assume you have to buy new equipment to improve your bagging operation. After making comparative studies of equipment available, you find that the difference in cost of competitive equipment is $10,000.

At a 6% interest rate, the average yearly interest for the amortization period will be about $300. At an operating speed of five bags/min. with a one-shift operation, 600,000 bags are packed in a year. Prorated, interest amounts to only $.0005 per bag.

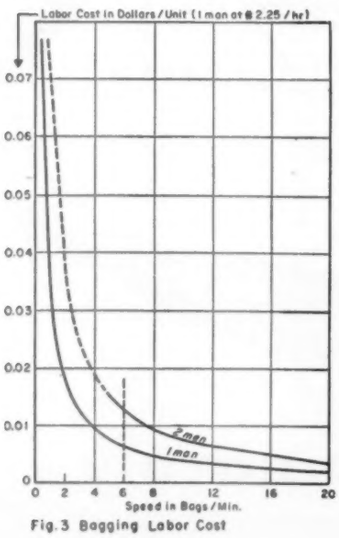

Fig. 3 Bagging Labor Cost

Five cost-cutting possibilities:

1. The importance of bag size. In a speed-up, one extra inch of cloth in the bag may be the difference between the success or the complete failure of a bagging operation. Take an extreme case for an example: A speed-up for two men from 6 cloth bags/min. to 20 bags/min., which would be an absolute top for two men.

As a result of the speed-up, we would reduce labor from $0.0125 to $0.0036 per unit, saving $0.009 per unit. (Fig. 3). But in a speed-up it is often necessary to use larger bags to ease bag handling at the higher speeds. In this case, using a conventional cloth bag, there would be no savings if the bag length had to be increased 1 in.

If the size-increase were not necessary, however, the $0.009 would represent about $21,000 in a working year (2000 hr.). This would allow for a $31,000 investment for new equipment, using the 52% tax and the three-year amortization.

2. When you can sacrifice accuracy for production. In bagging chemicals, poultry feed or other relatively high-cost commodities, a speed-up is not worthwhile if accuracy is compromised. There is little risk in a speed-up, however, when low cost commodities such as minerals are being bagged.

For example, as a result of the extreme speed-up mentioned above, there was a $0.009 savings per bag. If this speed-up resulted in a 3-oz. greater inaccuracy bagging poultry feed ($0.05/lb.), or a 1-oz. greater inaccuracy bagging a chemical ($0.25 /lb.), it would just about wipe out the savings. However, the $0.009 speed-up saving would pay for about 1 lb. of material per bag in the mineral class ($0.01/lb.).

3. When it pays to improve ac-

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We therefore present a restatement of the 8 basic requirements together with a breakdown in column form for Weevil-Cide and for the 10 basic grain fumigant types—the latter not otherwise identified.

In explanation we, as a company, are by no means sole arbiters as to whether a given requirement is satisfied by a given fumigant. While we have been foremost in formulating and stressing the basic grain fumigant requirements and in informing the trade as to the pertinent characteristics of various chemicals and chemical mixtures used as grain fumigants, the real answer as to whether a fumigant meets a specific requirement is largely based on the average opinions of elevator men. Hence, our evaluation interprets and reflects such opinions, together with our intimate knowledge of practical grain fumigation.

A check mark (✓) indicates whether the given requirement is satisfied.

BASIC FUMIGANT TYPES

	Weevil-Cide	1	2	3	4	5	6	7	8	9	10
1. Freedom from undue hazard to life or health under actual conditions of use.	✓	✓	✓	✓	✓	✓		✓			
2. Positive warning properties.	✓	✓	✓	✓	✓	✓	✓	✓		✓	
3. Non-flammability and non-explosiveness under practical conditions.	✓			✓	✓	✓	✓	✓	✓	✓	✓
4. That the fumigant leave no odor, residue or other harmful effect on the grain.	✓	✓	✓	✓	✓	✓				✓	✓
5. Effectiveness at recommended dosages against both immature and adult insects, thus minimizing or preventing reinfestation.	✓	✓	✓							✓	✓
6. Simple and convenient application.	✓	✓	✓	✓	✓	✓	✓	✓		✓	
7. Adaptability to use in widely varying types of grain storage units.	✓	✓	✓					✓			
8. True economy, meaning low unit cost for effective results.	✓	✓					✓				

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Vice President and Director of Sales

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HEADLINE FEATURES of this new machine include micrometer roll adjustment; warning-light signaling of auto-feed changes; emergency quick-release plunger for speedy roll disengagement, and rapid roll change.

The solid frame is smooth-lined for cleanliness; lubrication is thorough and seepage-free.

All parts are totally enclosed yet easily accessible.

The full story is told in the "Robinson Review" No. 8. Write for your copy now, to learn more of this newest-of-all rollermills. Address to:

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DON'T NEGLECT Elevator Heads
—They Start Fires

AVOID CHOKES — But If a Choke Occurs
Examine Head Pulley Immediately

. . . Several recent fires have occurred from failure to do so

If too hot for hand, cool with water or CTC or CO_2 extinguisher fluid

If Belt Is Smoking FLOOD IT

ASSOCIATION OF MILL & ELEVATOR MUTUAL INSURANCE COMPANIES
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curacy. Accuracy improvements can be justified easily. Consider bagging a $0.05/lb. material (feed) in 50 and 100 lb. bags at a rate of 12/min. where the bagging scale accuracy is plus or minus 4 oz. Improving the accuracy 2 oz. would save $4.50/hr. (Figs. 1 and 2). This savings would justify an investment of $13,000 for more accurate equipment, using the three-year amortization figures and the 52% tax.

Incidentally, the $4.50 saving is equivalent to the labor cost of two men. Therefore, the 2-man bagging systems operating at 6/min. at a 2-oz. accuracy, consequently, are no more costly than two men doing 12-min. with a 4-oz. accuracy.

4. Whether it is cheaper to use valve or open-mouth bags. If the operation is slow and the problem involves bag cost, the open-mouth bag is probably to be preferred. If bagging could be done with a non-tuck-in sleeve and glued bag, the valve would be preferred.

The valve bag, although it costs more than the open-mouth bag, is less costly to handle. Requiring no closing operation, it allows one man to run a bagging installation. At bagging rates lower than 5 or 6/min., however, one man can weigh-out and close open-mouth bags.

At higher rates the extra labor needed to close the open-mouth bags nearly balances the valve cost. If the difference in cost of the two bags, for instance, is $0.007 at a bagging rate of 6/min., the valve bag costs as much to use as the open-mouth unit (Fig. 3). The same applies when the difference is $0.0018 and bagging rate is 20/min. It takes careful study to find out which bag is best at high rates. An impartial bag supplier can make such a study best for you.

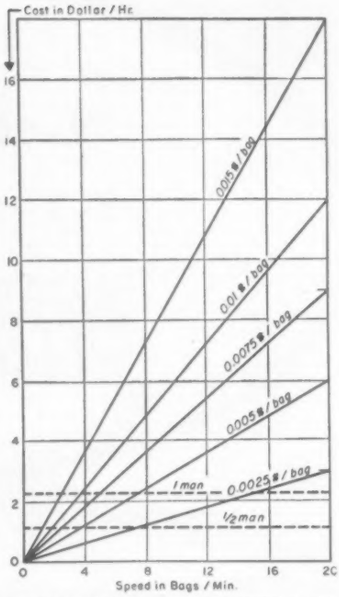

Fig. 4 Container Cost for Increment of Size

5. How much may be saved by putting in automatic sewing. Before considering automatic sewing, you should be sure you are getting the best accuracy and the lowest bag cost.

An important thing to remember is that it is nearly impossible for an

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The Chatfield & Woods Sack Co.
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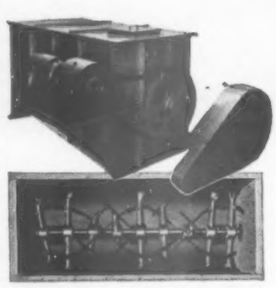
whatever your *Mixing* problem, a **PEERLESS MIXER** does the job



MORE Efficiently... MORE Economically!

Here's the most adaptable mixer ever built!
Specially-designed beating arms speed mixing operations. The agitators or flights (designed after checking several thousand mixing operations) beat, fold, overlap and agitate each particle thoroughly. All-Welded Steel Construction for extra strength . . . anti-friction bearings for extra smooth operation. Consult our Engineering Department for your specific requirements . . . without obligation.

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automatic sewing device to completely replace a sewing operator. Sewing heads require maintenance. Much of this maintenance is performed at manual installations by the sewing operator. He frequently oils the machine, repairs broken thread, adjusts the sewing head, besides performing general preventive maintenance service.

He is also an inspector; he sees when a thread breaks and holds up operation until repairs are made. Where a tape closure is involved, he fingers the top of the bag to make certain that the sewing passes through both the tape and the bag.

With automatic sewing, therefore, maintenance may become a problem. Automatic sewing certainly will not eliminate a full man. A more realistic figure would be "one-half of a man."

It is unlikely that automatic sewing can be had by eliminating one-half man. Based on a figure of $4,500 a year, cost for one-half-man amounts to $2,250. For a three-year amortization and a 52% tax on profit, an investment of only $3,300 can be justified, which is probably too small to buy automatic sewing equipment.

Before reducing labor cost by installing automatic sewing, it pays to exploit the possibilities of better accuracy or reduced bag cost. For example, in bagging a commodity costing $0.05/lb. at a rate of 12 bags/min., a ½-oz. accuracy improvement will save as much as automatic sewing.

It is probably more feasible to buy with the $3,300 a ½-oz. accuracy improvement rather than automatic sewing equipment. Relative to bag cost, automatic sewing could easily require the use of larger bags to facilitate the automatic sewing operation. At 12 bags/min., a bag cost increase of $0.0015 would cancel out a $3,300 savings provided by automatic sewing.

On the other hand, where accuracy and bag cost are at the optimum and where speeds of, say, 20/min. and a three-shift operation are involved, labor reduction could provide a saving. If two 2-man systems are required without automatic sewing, a saving of 2½ men on each shift is possible.

This saving would amount to $33,750 per year. It would justify an investment of about $53,000 on the basis of three year amortization and a 52% tax. Significantly, if the tonnage is high, automatic sewing can be important.

—BREAD IS THE STAFF OF LIFE—

Nebraska Grain Group Notes Year's Projects

LINCOLN, NEB.—The "increased demand" for Nebraska wheat has resulted in an estimated $4 million in extra income to the farmers in the premium area of the state, the Nebraska Grain Improvement Assn. notes in its 16th annual report.

The association calls the "great demand for Nebraska wheat" one of the highlights of the year.

The group placed special emphasis during 1953 on activities to encourage more sanitary grain storage, improve the quality of grain marketed in Nebraska, wider quality testing of experimental wheat varieties and increased interest in crops activities among 4-H and FFA members.

During the year, among other activities, it spearheaded a cooperative grain sanitation survey of wheat stored on farms and elevators in the state; conducted 12 regional wheat improvement plots with 904 samples; held 16 field plot meetings; arranged and cooperatively sponsored 11th annual Nebraska Wheat Show which had 529 entries and an attendance of about 1,200; advertised Nebraska wheat quality in four milling and baking journals which reach a total of 39,415 potential buyers, and cooperated in holding four grain grading schools for country elevator operators.

The association had a net gain of 25 members during the year, and financial support was greater.

Included in the plans for 1954 are these projects:

Working with farmers' sample plots, more work on drillbox seed surveys, sponsorship of the Nebraska Wheat Show and the state milling and baking contest, promotion of grain sanitation and adequate storage, education work in regard to alternate crops for diverted acres, a campaign to tell farmers of the need for maintaining the high percentage of their wheat acreage in Nebred and Cheyenne and stimulation of interest in crop production and marketing among 4-H and FFA members.

Officers of the association for 1954 include Harry R. Clark, Omaha Grain Exchange, president; Henry J. Schmitt, Omaha Flour Mills, first vice president; Earl Gale, Gale Grain & Fuel Co., McCook, vice president; Bruce Hagemeister, Hagemeister's, Inc., Sidney, vice president; Bryon Dunn, National Bank of Commerce, Lincoln, treasurer; Leslie F. Sheffield, University of Nebraska, secretary, and J. C. Swinbank, University of Nebraska, consultant.

—BREAD IS THE STAFF OF LIFE—

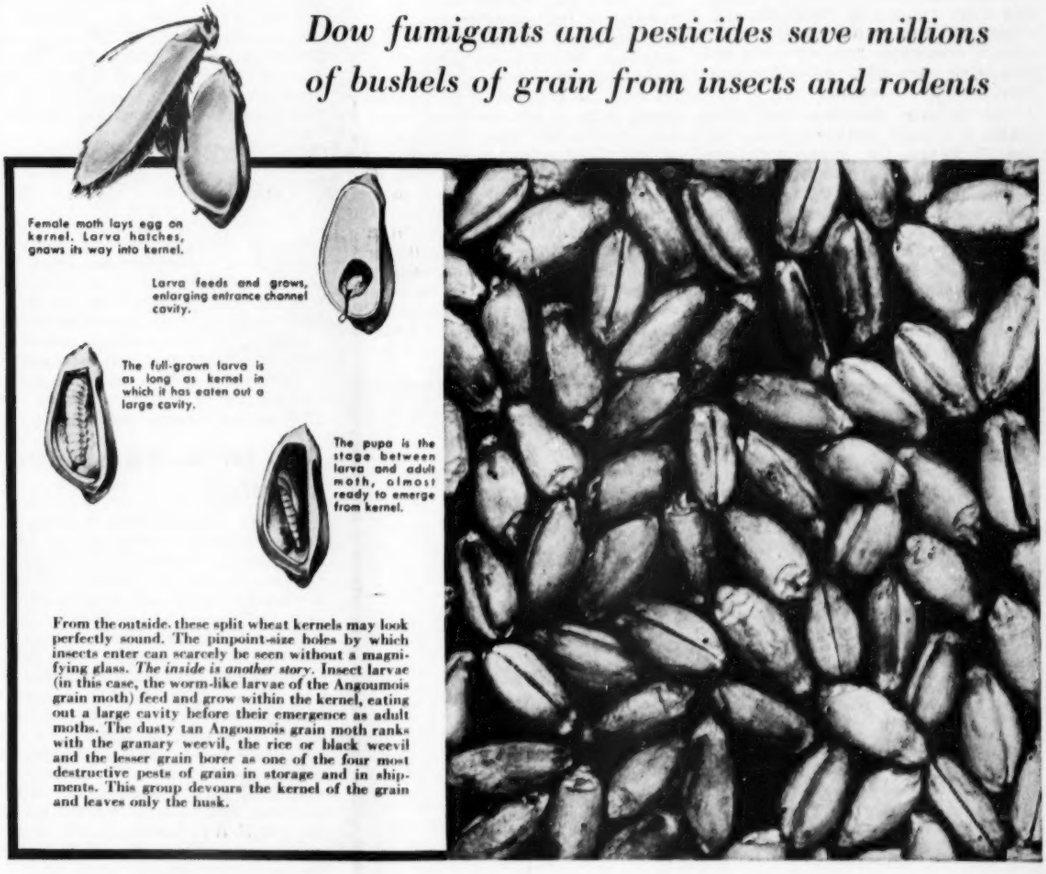
VIRGINIA STORAGE EXPANSION

FREDERICKSBURG, VA.—Storage facilities to handle 300,000 bu. of grain immediately with an ultimate goal of a half-million bushels will be built by the Janney-Marshall Co., Inc., milling firm of this city. Niles Straughan, president of the firm, said that the facility will be built in Stafford County just outside the city.

DOW

THIS CAN HAPPEN TO YOUR GRAIN WHEN FUMIGATION IS INEFFECTIVE

Dow fumigants and pesticides save millions of bushels of grain from insects and rodents


Female moth lays egg on kernel. Larva hatches, gnaws its way into kernel.
Larva feeds and grows, enlarging entrance channel cavity.
The full-grown larva is as long as kernel in which it has eaten out a large cavity.
The pupa is the stage between larva and adult moth, almost ready to emerge from kernel.

From the outside, these split wheat kernels may look perfectly sound. The pinpoint-size holes by which insects enter can scarcely be seen without a magnifying glass. *The inside is another story.* Insect larvae (in this case, the worm-like larvae of the Angoumois grain moth) feed and grow within the kernel, eating out a large cavity before their emergence as adult moths. The dusty tan Angoumois grain moth ranks with the granary weevil, the rice or black weevil and the lesser grain borer as one of the four most destructive pests of grain in storage and in shipments. This group devours the kernel of the grain and leaves only the husk.

Dow's powerful vaporizing fumigants destroy eggs, larvae, pupae and adults of weevils, moths and other insects found in grain, even if they hide deep within the kernels. Rodents, too, are killed in hiding places inaccessible to ordinary fumigants. It will pay you to get the *inside story* of an efficient fumigation program. Write our Fumigant Sales Section for the name of a technician in your area, specializing in flour and cereal mill fumigation with these proved products:

Dow Methyl Bromide for general space, vault, box car and tarpaulin fumigation . . . Dowfume® EB-5 for control of stored grain pests in elevator storage bins . . . Dowfume EB-15 for spot fumigations in machinery to prevent insect buildup between general space fumigations with Dow Methyl Bromide . . . Dow Mill and Bin Spray (containing Lindane) for residual spray, space spray or fog-type aerosol application. THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on DOW FUMIGANTS DOW

Worth Looking Into

New Products
New Services
New Literature

This reader service department announces the development of new and improved products, new services and new literature offered by manufacturers and suppliers. Claims made in this department are those of the firm concerned. Use the accompanying coupon to obtain the desired information.

4023—Pneumatic Handling Bulletin

The Fuller Co., Catasauqua, Pa., offers a new 16-page, two-color bulletin covering applications of the company's Airveyor system in the pneumatic handling of flour.

Entitled "Flow Your Flour," the bulletin explains and illustrates how the Airveyor system pneumatically conveys flour from carriers to storage, and from storage to processing. Included is information on how the system eliminates bagging costs and cuts labor costs while providing sanitary, dust-free handling.

The bulletin describes and illustrates 5 typical installations — the Emrich Baking Co., Minneapolis; the Canada Bread Co., Toronto; American Stores, Philadelphia; V. La Rosa & Sons, Inc., Danielson, Conn.; and the National Tea Co., Milwaukee. Illustrations include 26 pictures and 5 schematic drawings.

Also given is information on the Fuller-Gramm truck designed for hauling flour in bulk. The truck is engineered for loading and for unloading by the Airveyor system.

To obtain copies of the bulletin, check No. 4023 on the coupon and mail it.

No. 2917—Bulk Car Unloading

Cargo Handlers, Inc., has announced new developments in its cargo handler box car unloader, said to conveniently handle grain, chemicals, etc. The design capacity, according to the manufacturer, is 10,000 bu. grain in one hour. A flight conveyor, which is fed automatically from both the front and the sides, conveys the material through articulating units of belt conveyors out the door of the box car. The front end of the flight conveyor eats into the pile, thus feeding the conveyor. The hydraulic controlled side scraper arms reach out to the walls of the box car and scrape the material into the conveyor. The speed of the unit is controlled so that the combined feeding facilities keep the flight conveyor operating at full capacity at all times when sufficient material is in reach of the machine, it is claimed. Also, the adjustable side arms permit the machine to operate through the full width of the car as it proceeds. For more complete information check No. 2917 on the coupon and mail it.

No. 2916—Bulk Removal From Bin

A device for the controlled removal of non-free-flowing bulk materials from deep storage bins has been announced by the Superior Grain Separator Co. Trade-named the Exbinner, it is said to make active a greater portion of the bin bottom to eliminate bridging and segregation of ingredients. The flow of materials to conveyor or scales is smooth and continuous, under complete control

of the operator, it is claimed. The machine is of all-metal construction, and is available in three sizes with opening to bin of: 12 x 48 in.; 24 x 48 in. and 67½ x 48 in. Superior is manufacturing and distributing the Exbinner under exclusive license from the inventor, V. E. Forrest. For more complete details check No. 2916 on the coupon and drop it in the mail.

No. 2929—Grain Probe

A new type open-end spiral probe, which is claimed to assure fair proportions of grain samples from the bottom levels as well as from the top, has been announced by the Seedburo Equipment Co. According to the company, the usual trough necessary in conventional partition type probes is eliminated in this probe. Complete information is available. Check No. 2929 on the coupon and mail it.

No. 6075—Fumigant Catalog

A new informational catalog on methyl bromide fumigant has been issued by the Agricultural Chemicals (Eston) division of American Potash & Chemical Corp. The purpose of the new catalogue is to acquaint the trade with new uses found for methyl bromide in recent years. At the same time, the company announced production of its new M-B-C fumigant (methyl bromide containing chloropicrin as a warning agent) for use in certain areas and in such places as flour mills, grain and rice storage and other uses. Copies of the informational catalogue on methyl bromide and M-B-C fumigants can be obtained by checking No. 6075 on the coupon and dropping it in the mail.

No. 6086—Box Car Loader

A power operated headstand has been added to the flexible box car loader of the Power-Curve Conveyor Co. giving push button control of discharge height. Especially designed for continuous loading of bags, the loader is able to discharge at any height from 3½ to 6½ ft. Bags can be packed to full ceiling height in box cars or trailers. The headstand lifting mechanism uses a mechanical screw-jack which is chain-driven by a gear-reduction motor. Limit switches are incorporated to protect the mechanism. Placement of the headstand permits discharging up to 6 ft. beyond and above lower tiers of bags for stability and ease in stacking. The operator can move the discharge end with one hand while operating the height controls. The car loader is self-propelled, self-retracting and reversible. It can be made in any desired length. For more complete information check No. 6086 on the coupon and mail it.

No. 6049—Adhesive

Palletite, a new non-skid, ready-to-use, moisture resistant adhesive for palletizing or unit loading of bag or case shipments has been introduced by Swift & Company's general adhesives department. Designed to resist horizontal shifting during transit but to release easily on vertical pull, this adhesive provides an immediate strong bond when applied by machine or brush, the company claims. Tests on trial shipments show that an average of one gallon is sufficient to palletize a carload shipment. Swift has produced literature describing Palletite and other pelletizing adhesives made by the company. To secure this literature check No. 6049 on the coupon and mail it.

No. 6062—Towing Tractor

New features have been incorporated in the redesigned "Clarkette 5" line of general utility towing tractors, according to the manufacturer, Clark Equipment Co. While basic dimensions of this 500-lb. drawbar pull capacity machine have been retained, the driver platform has been lengthened and the brake pedal relocated to provide more room for the operator without affecting the turning radius and the intersecting aisle dimensions. The control lever has been altered and the center control linkage has been moved to a lower cross bar, so that the control handle is now obstruction free. The exhaust pipe has been moved to the right front side of the truck. The Continental N-62 engine has been equipped with revised piston rings and aluminum pistons. There is no increase in price. For complete information check No. 6062 on the coupon and mail it.

No. 2896—Bag Closing Machine

Burrows Equipment Co. has announced a new model bag closing machine. This machine weighs 30 lb., uses standard two thread chain stitch, and handles all bags—cloth, paper or burlap. The unit can be used as a

portable machine or permanently suspended from the ceiling with two pulleys and cable. It is equipped with direct drive and a totally enclosed ball bearing motor. For complete details, check No. 2896 on the coupon and drop it in the mail.

Send me information on the items marked:

- ☐ No. 2896—Bag Closing Machine
- ☐ No. 2916—Bulk Removal from Bin
- ☐ No. 2917—Bulk Car Unloading
- ☐ No. 2929—Grain Probe
- ☐ No. 4023—Pneumatic Handling
- ☐ No. 6049—Adhesive
- ☐ No. 6062—Towing Tractor
- ☐ No. 6075—Fumigant Catalog
- ☐ No. 6086—Box Car Loader

Others (list numbers) .....

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The Northwestern Miller

P. O. Box 67,

Reader Service Dept. Minneapolis 1, Minn.

Engineers Hear Report on Bin Design Method

PITTSBURGH—A practical solution to the problem of designing bins and hoppers quantitatively is in sight, it was announced recently at the semiannual meeting of The American Society of Mechanical Engineers.

Andrew W. Jenike, consulting engineer, Salt Lake City, stated that only a small effort remains to develop generalized design data in a form useful to industry. He presented a "flow factor" concept of a bulk solid and a method and apparatus to measure flow factors, employing simple formulas governing the flow of bulk solids. The formulas contain coefficients that depend on the shape and size of the bin or hopper. These coefficients have yet to be established experimentally.

The importance of the problem was indicated by that fact that, in a trend toward automatic operation of handling, every link must be reliable. At present the only way to predict how a material will flow through a bin is a full-scale test, except where experience provides reliable guidance, it was reported.

The "flow factor" of a material was defined as the ratio of peak compressive strength to unit weight of the material as a function of the ratio of compacting pressure to unit weight. Physically, the flow factor is the radius of the largest circle over which the compacted material can form a stable dome.

Flow factors are measured on a special transverse shear testing machine on which samples of the material in a round shear box may be compacted to any desired degree and for any length of time. The shearing load is applied by means of a proving-ring system. The deflection of the ring, shown by a dial indicator, is read at the point of rupture and gives the maximum shearing stress. The test is repeated for different values of test pressure.

Composition Important

Composition of the sample was found to be important with materials of a wide range of particle size because under field conditions segregation cannot be eliminated completely. Since the fine fraction builds up a higher strength than the uniform mixture, only the fine fraction of the material can be used in the test.

It was pointed out that a loose bulk solid flows through a bin when stresses produced by the weight of the mass exceed the strength of the solid. Since compacting pressure contributes to this strength, it is advantageous to keep it low and to operate with materials having stable surface conditions.

Compacting pressure is built up in three ways: by weight of the material, by the impact of falling particles, and by the vibration of the structure. Solidity of the mass may be caused by changes on the surface of the particles such as moisture content.

Two classes of bulk solids were recognized: fine and flaky materials, which pack and build up high strength per unit weight under pressure, but flow readily when aerated, and non-aerated materials, which are subject to impact pressure and therefore cancel whatever advantage there might be in the low static pressure of steep-walled hoppers.

In spouts and chutes, where static pressure is low, compaction results from either impact or vibrational pressure, and can be prevented by designing to prevent the material from being brought to an abrupt halt within the spout or chute.

Copies of the paper, No. 54-SA-34, may be obtained at 50¢ each from Order Dept., ASME, 29 W. 39th St., New York 18.

——BREAD IS THE STAFF OF LIFE——

SAFETY QUIZ

Roger Bear, safety director of the Kroger Co., uses a hand-out safety quiz to stimulate thinking on safety. Below is a typical example:

Check Your Own Safety "I.Q."

Do you—

Set a good example of safe practices in your own acts?

Keep on the alert for unsafe conditions and practices?

Welcome suggestions on ways to make the place safe?

Teach new employees how to lift properly?

Keep first aid kit filled?

See that all employees make use of provided protection?

Discourage short-cuts and chance-taking to everybody?

Make a daily practice of talking safety to at least one person?

Keep a sharp lookout for fire hazards?

Post all safety bulletins on the board?

—From the Safety News Letter of the Food Section of the National Safety Council.

THE CHOICE OF THE CONNOISSEUR

INDIA TEA . . .

From Ceylon to Darjeeling the natives are busy catering to the tea parties of the world, and to the epicures who think that the finest tea in the world is grown in this area.

A Tea Expert can often tell the exact garden a given sample has been grown in, because of its type, color, taste or bouquet.

A Milling Expert can likewise distinguish Swiss Silk Bolting Cloth.

He knows that for long runs of quality flour, reels and sifters covered with dependable Swiss Silk perform at peak production.

You can't beat Swiss Silk Bolting Cloth

For Genuine HIGHEST QUALITY

Swiss Silk

SPECIFY YOUR BRAND

BODMER • DUFOUR • EXCELSIOR • SCHINDLER • WYDLER

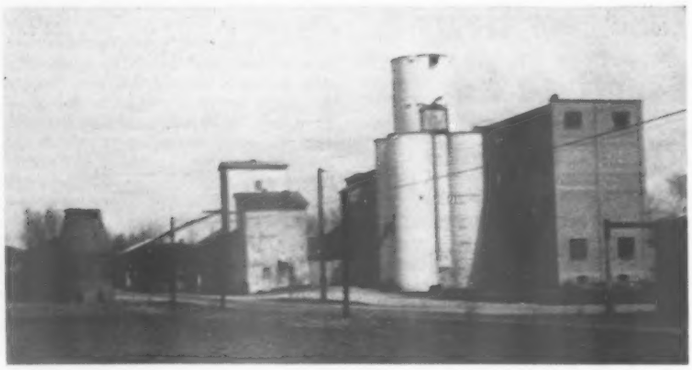
SUPERIOR CARBIDE TOOLS
For All Roll Corrugating
Economical Increased Output
CORRALLOY TOOL CO.
Minneapolis 7, Minn.

Enjoying the Building Of a New Flour Mill

● By Emmett Loy

We started our mill building program in 1949 with the purchase of milling machinery from the Lakeview Milling Co. in Chambersburg, Pa., which had belonged to the Wolf company of that city.

Of course, there had to be many changes before we could really start on the actual construction of our new flour mill building — such as moving one building, tearing down another and then building two new ones, one for a warehouse and the other for a garage and shop. All this had to be done to clear the ground where we wanted to locate our new flour mill building. All of this took time and money, and we actually got started on our new flour mill building in the fall of 1950.



LOY PLANT—This is an over-all picture of the entire plant of Loys' Mill at Pyrmont, Ohio. The cob burner is on the left, then the feed mill, the old flour mill and the silos. The new flour mill building is on the right.

In the spring of 1951 the steel frame was erected, and the job of laying the brick for the walls enclosing the steel frame was begun.

This job took the greater part of two summers as it required over 60,000 brick, and one man laid every brick himself. In the fall of 1952 the last brick was put in place, the roof was put on and the glass was put in the steel window frames just before the cold weather set in.

Then during the winter of 1952-53 we got out of storage our seven stands of rolls which we had obtained in Chambersburg, Pa., and put them into the new building. We tore them down completely and rebuilt them, replacing every part that was worn. We painted them inside and out and bolted them down in place and poured cement hoppers in the bottom of each stand.

There have been many changes in our plans since we started this project. We first started out to build a seven-stand mill with the old style bucket elevators. Since then we have changed our flow to an eight-stand mill with a pneumatic system for elevating mill stocks.

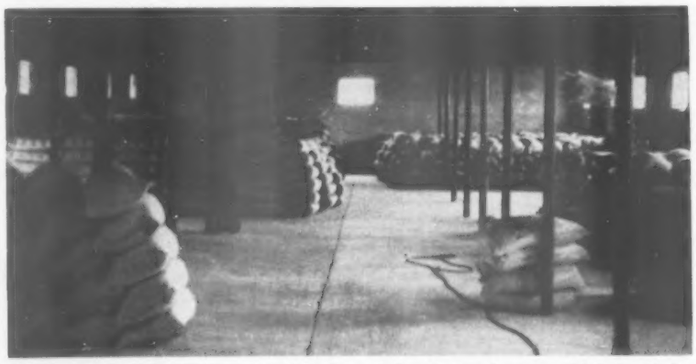
We have bought machinery from east to west, Pennsylvania to Kansas; north to south, Michigan to Tennessee. And eventually we will get a pneumatic system from England. That is our plan now.

We have spent many dollars in postage, phone calls and miles of travel by car, rail, plane and truck getting this machinery together, along with the necessary information that it takes to build a new up-to-date flour mill that we feel will be the most modern flour mill in the U.S.

As it now stands we will use eight stands of double rolls, ball bearing, ranging in size from 9x36" to 9x24", giving us 432 in. of roll surface. We will use three Great Western sifters, two of them 6x22 and the other 4x22, which will give us 985 sq. ft. of bolting surface. These are new.

We will have three new Strong-Scott ball bearing aluminum purifiers in this flow. All lineshafting and machinery will have antifriction bear-

EDITOR'S NOTE: Emmett Loy, Loys' Mill, Pyrmont, Ohio, is building a new flour mill in the little community of Pyrmont. Here he tells how he has enjoyed the task of planning and constructing what he feels will be "the most modern flour mill in the U.S." Work on the new plant, which will have a 24-hour capacity of 840 sacks, was started in 1950 and is expected to be completed in 1955. The old mill has continued in operation while work on the new plant has gone on.



WAREHOUSE—This is an inside view of Loys' warehouse, which is 40 by 100 ft.

G&K Leather Belting "bear hugs" the pulleys for top production-power

It Grips — Leather's resilient, frictional surface "bear hugs" the pulley face, causing belt and pulley to move as one power unit.

It Pulls — Leather is strong, flexible, with controlled stretch — gives peak performance on *any* drive.

It's 3-Dimensional — Leather's millions of fibres are interlaced in all directions to form the tough *three-dimensional* structure so necessary for PULLINGRIP . . . *developed to the highest degree in G&K Leather Belting.*

Call your G&K Industrial Supplies Distributor for flat, round, link and V-belting, belt lacing, dressings, cements, packings and specialty leathers. Free Belting Catalog.

GRATON AND KNIGHT

Memo: Flour Mill Superintendents

Only a top grade leather belt can handle a drive like this. Quality belting is important on Sifter, Universal Bolter, Bran and Shorts Duster, Roll and Double Reel Drives. That's why superintendents specify G&K RESEARCH® brand . . . it's famous for minimum stretch and highest coefficient of friction.

GRATON & KNIGHT Company

WORCESTER, MASSACHUSETTS

World's Largest Manufacturer of Industrial Leather Products

CHECKERBOARD ELEVATOR CO.

MILLING WHEAT • COARSE GRAINS • MILLFEED

Hard and Soft Winter Wheat

ST. LOUIS • KANSAS CITY • MINNEAPOLIS • DENVER • BUFFALO

NEW BUILDING—This is a front view of the new flour mill building at Loys' Mill. Also shown are the grain silos and the old mill building in which the present flour mill is still running.

ings, either ball or roller, which we think will save us power.

We will use electric power, with several motors arranged to the best advantage.

The capacity is to be about 35 sacks an hour, with the necessary provisions to increase it 20 to 25% if and when wanted. The flow will be arranged to make two or three grades of flour at the same time if necessary in the future.

The four floors and basement of this building are all painted white inside, and all bins will be of steel and painted white when finished. The spouting will be aluminum, round in shape, and will not need painting.

Up to the present time we have done all the work ourselves, except for the steel frame and brick work, which was contract work.

We hope to be able to finish the installation of the machinery and spouting with as little millwright labor as possible. We have two reasons for this procedure. First, our time and the common labor we can get around here are cheaper than millwright labor. Second, by taking more time to do all the work ourselves, we can distribute the cost over a longer period of time, which is something.

Old Mill Still Running

Of course, our old mill is still running every day and some nights, which is helping to pay for the new mill as it is being constructed.

If the good Lord continues to smile on us, giving us good health and our share of honest business, we expect to have this new mill ready to run on the 1955 harvest.

We are ever thankful to our Heavenly Father for all our blessings from day to day, in our work and our play, and we are enjoying every minute of this work.

All our flour is delivered to the large biscuit bakeries, except for a little sold at the mill for family use and to one large jobber who serves the small bakers in his city and surrounding towns.

Some of our flour is packed in cotton and the remainder in 100-lb. paper valve bags. We built a valve packer for this job.

We have our own machine shop and do all our welding and repair work. We also have our own garage and mechanic who keeps our trucks and cars in repair.

We are thankful to be located in the best soft red wheat belt in the country, where we can get plenty of wheat from the farms delivered right to our mill door from the farmers' trucks all year around. We never have to worry about wheat.

We also enjoy a very good custom feed grinding and feed sales business with our customers, and in that way we sell quite a lot of our mill feed at retail at the mill. The remainder is sold to feed mills and elevators near home.

We have lived here in this little town of Pyrmont, Ohio, all our lives and have been in the feed and flour business since 1920. We have ground flour since 1930. The first ten years we ground only feed and sold feed.

We believe our little village of about 200 persons is the garden spot of the world. My father was a country school teacher in the days of "the little red school house," and I was a mechanic working in Dayton before we bought the little feed business in 1920. My son Elmer grew up in the milling business and expects to stay.

We have fourth generation customers trading with us today, and we hope we can continue to keep their good will and business.

—BREAD IS THE STAFF OF LIFE—

RICHARDSON MOVES OFFICE

ATLANTA—Richardson Scale Co., Clifton, N.J., has moved its Atlanta branch office to 423 Grant Bldg. E. C. Mott will continue as branch manager. The company also announced that the territory of Arkansas, Louisiana, Mississippi and Western Tennessee is to be assigned to the new Richardson office in Memphis. These areas were formerly covered out of the Atlanta office.

"The Most Important Single Factor" To increase PASTINA sales...

Here's exactly what one of the leading advertising executives serving the macaroni industry states:

"We all know that the health appeal is tremendously important in the sale of all food products, especially macaroni. However, in the sale of *pastina products* to mothers the *health appeal is all-important.*

For pastina, *I feel that enrichment is the most important single factor,* from an advertising and selling point of view."

Mothers want the very best foods for their children so they will grow strong and healthy. What can make your pastina—and all of your macaroni products—better? One word gives the answer—*enrichment.* Why does enrichment make them better? Because enriched foods are nutritionally more valuable. Doctors and diet experts support enrichment for its great health value.

When you enrich your pastina you add three essential "B" vitamins—thiamine (B_1), riboflavin (B_2) and niacin—plus iron. By enriching, you restore those valuable food elements which are unavoidably lost during milling and processing.

Make plans now to boost the sale of your pastina by enriching it, and by featuring enrichment's powerful appeal to mothers in all of your advertising and on your packages, displays, posters.

ROCHE *Vitamins for enrichment*

VITAMIN DIVISION • **HOFFMANN-LA ROCHE INC.** • NUTLEY 10, N. J.
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MILL COGS

We make ALL kinds. Specialize in "Ready Dressed" cogs which are READY TO RUN the moment driven and keyed. Write for circular "DW" and instruction sheets free.

The N. P. Bowsher Co., South Bend, Ind.

Protein Test for Canada's Wheat Vetoed

TORONTO—The grading of wheat by protein is unlikely to be adopted in Canada at the present time despite critical comments voiced by representatives of the Interprovincial Farm Union Council when they appeared before the parliamentary committee on agriculture in Ottawa recently.

Appearing before the same committee, officials of the Board of Grain Commissioners came out firmly against the system because of its impracticability as far as Canada was concerned, backing up their objections with detailed explanations.

D. G. McKenzie, board chief, said that steps had been taken to investigate the feasibility of this type of grading but the obstacles were too great to permit its adoption. He agreed that a premium was paid for high protein wheat in the U.S. but there was, he pointed out, a fundamental difference between that country and Canada. The U.S. exported 30% of the wheat production and consumed 70% at home, while in Canada these figures were reversed. There was a strong U.S. demand for high protein wheat to mix with soft wheat and U.S. millers were willing to pay a premium. Canada's main overseas customer, however, was the U.K. and the millers there, being satisfied with the run of wheat shipped to them, were not willing to pay a premium.

Another factor militating against the adoption of protein grading, Mr. McKenzie said, was that no quick method of determining protein content of wheat had been evolved. Such a quick method would be a necessity so that examination and assessment could be made speedily and accurately by the elevator agent so that the premium could be credited to the grower.

Dr. J. Ansel Anderson, chief chemist for the board, said there were theoretical possibilities for protein grading but the procedure would not be simple and would require a substantial change in the present grading system. It was the practical aspect that provided the main obstacle in Dr. Anderson's opinion because of the inability of the chemists to come up with a simple method of assessment. The U.S., he added, used the sampling market system to determine the protein content of wheat, but that system would be difficult to use in Canada without upsetting the present bulk handling methods.

Roy Milner, a member of the board and currently federal transport controller, came out firmly against the introduction of protein grading. If the top were skimmed off the crop this would reduce the quality of the remainder and Canada would find itself on equal competitive terms with such countries as Australia and the Argentine in the lower quality wheat market.

J. H. Harrison, a member of the committee, expressed the opinion that the board would not find the western farmers united in any demand for protein grading.

Another member, Irvin Studer, considered that individual farmers should be rewarded for quality production. He pointed out that the riding he represents in parliament borders on Montana for 100 miles and farmers saw their U.S. counterparts just across the line receiving 46¢ bu. premium for their high protein wheat while farmers in Canada raising the same kind of wheat received no bonus.

—BREAD IS THE STAFF OF LIFE—

Monsanto Aids Colleges

ST. LOUIS — Monsanto Chemical Company's program of financial aid to scientific education for the 1954-55 school year will benefit 44 American colleges and universities, Dr. Carroll A. Hochwalt, vice president, announces.

There are 13 fellowships, 27 undergraduate scholarships and 17 cash grants for a total of 57 direct aid awards to be distributed among these schools.

The fellowships are established for graduate study and have an average value of $3,000 with the larger part of this amount going to the fellow. The scholarships are in amounts intended to cover tuition costs and are to be awarded by the administering schools on bases of both merit and need. The grants are contributions which may be used to finance research, equipment purchases or other scientific purposes.

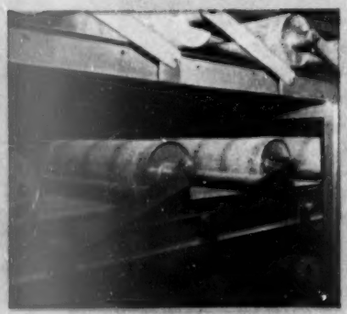
Dr. Hochwalt pointed out that these awards are one phase of Monsanto's over-all program of cooperation with scientific education. Other phases include grants to educational projects of the National Science Teachers Assn., the American Institute of Chemical Engineers and the American Chemical Society.

In addition, Monsanto's operating divisions support scientific education through numerous grants for specific research, through faculty and student trainee programs and by the donation of equipment and materials to schools.

Extra Care Means Better Bags for You

Experienced inspectors carefully examine newly tubed bags before they move on to sewing machines. Careful inspections after every step in the production of V-C Multiwall Bags mean a better package for your product.

V-C representative discusses customer's new printing plate with V-C engraver. Bag Division representatives work closely with top production personnel to make sure rigid specifications are carefully followed.



Part of a battery of heavy rollers which super-seal pasted bags. Carefully applied fast-drying glue and eight minutes of constant, heavy pressure from these rollers securely bond the surfaces of all pasted V-C bags.

V-C Multiwall Bags are made by people who understand the importance of careful construction. It's this extra care in construction that makes V-C multiwalls better for your product. Extra care plus modern bag-making methods, materials and machinery give V-C multiwalls the ability to stand rough treatment while your product is being shipped or stored. Without cost or obligation, ask for full details about better-built V-C Multiwall Bags.

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DISTRICT SALES OFFICES: Atlanta, Ga. • Wilmington, N. C. • New York, N. Y. • E. St. Louis, Ill. • Cincinnati, Ohio

MILLING INDUSTRY

(Continued from page 3a)

ness, or will basically change our technological method of wheat conversion to a food product.

We must be on the brink of or very close to something big, something new, something revolutionary. We can't wait too much longer. We have been using the roller mill method for converting wheat to the staff of life for so many years that surely soon that simple idea may convert our industry into one of the most dynamic, one of the most interesting technological changes in our times.

Must Keep Alert

We as AOM members must be ever alert so that we aren't sleeping at the switch or unable to run with the tide when it turns.

Are we keeping ourselves fresh? Are we keeping ourselves technically minded to be able to roll with an unknown quantity of change?

Someone simply must come up with a revolutionary processing method which will cause us to scrap all of our old rolls and equipment which has been used for these many years. Otherwise we cannot keep up with that 3% improvement factor that other industries report.

The Bureau of Business Research of Ohio State University presented data showing our industry of flour and other grain mill products to have changed in productivity since 1939 down 12%, whereas industries such as canning, paper-pulp, and glass increased in output per given effort as high as 45%.

Factory Magazine says output per effort must increase 43% between 1950 and 1960 to provide a steadily rising standard of living for our growing population, and at the same time stay prepared to meet any aggression.

This industry, which represents the biggest part of the food energy in our national diet, must show that it has virility, some imaginative ability. Research should surely uncover, as it has in other industries, a new, a better, more economical improved method of flour manufacturing.

Let us all resolve to be the men who will guide that change, who will produce that change and make it work. Personally I am very optimistic. I am very happy to be a part of this show. I hope that I shall be a part of this technological change if and when it occurs.

AIR CONDITIONING

(Continued from page 1a)

A few words may be appropriate as to how temperature and humidity of outdoor air influence conditions within the mill. Changes may be seasonal, or they may occur during short periods, but most effective milling cannot be performed all the time under fluctuating air conditions. For example, at 100° F. outdoor temperature (read on a dry-bulb thermometer), the heat generated during milling will increase indoor temperature about 20° F. This results in warm moist air and may cause "sweating," i.e., deposit of fine droplets of water on the structure, etc. Part of the hot moist air is removed, but part stays on and can raise room temperatures to, say, 115° F. In very cold weather, the heat generated in the mill may not be sufficient, and warm air has to be supplied at higher temperature.

Air conditioning problems for flour mills are, therefore, more complicated than normal, because this generation of heat within the building from processing has to be considered. (Fig. 4.)

The main purpose of efficient air conditioning is avoidance of adverse temperature and humidity conditions in the mill, and it is often advisable to stipulate two different values of air temperature for summer and for winter conditioning in order to make the job of the air conditioning plant easier. The weather in this country, with fluctuations sometimes of 10 to 15° F. in outdoor temperature between morning and evening, or one day and the next, obviously gives great scope to air treatment for the milling process.

It should be emphasized that the layout of air conditioning plants varies widely, according to their purpose. It is impossible to deal in a brief survey with the innumerable possibilities of grouping of air conditioning elements and of their control.

It is not intended here to describe in more detail central air conditioning plants for flour mills because for new mills they will be supplied by the main contractor and for existing buildings a specialized firm can be entrusted with the design and installation. It may be, however, that in existing flour mills, in one or the other small department, conditioned air might be found of special advantage.

It is here that unit air conditioners can be of assistance. In a typical unit

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Control chemists recognize these points of superiority in MERCK VITAMIN MIXTURES:

1. **Uniformly light in color.**
2. **All ingredients are so finely divided and thoroughly mixed that uniform distribution can be attained in every pound of flour.**
3. **Flow readily and feed easily in the customary feeders.**

Because of these advantages MERCK VITAMIN MIXTURES are preferred by so many quality control people in the industry. *And remember:* Enrichment adds a potent plus at the point of sale.

MERCK VITAMIN MIXTURES

For Flour Enrichment

Research and Production for the Nation's Health

MERCK & CO., INC.
Manufacturing Chemists
RAHWAY, NEW JERSEY

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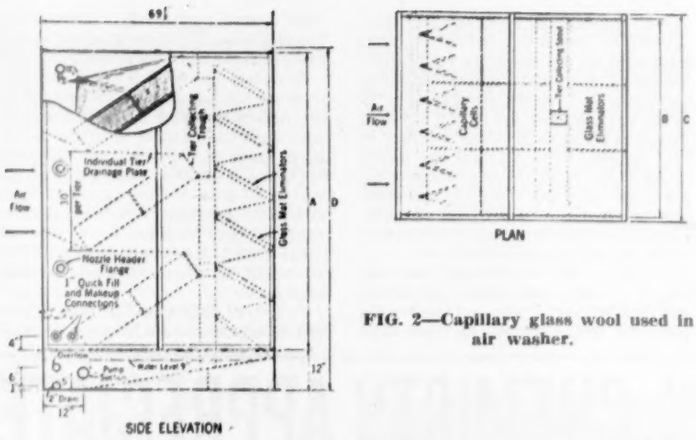

FIG. 2—Capillary glass wool used in air washer.

air conditioner, consisting of the same elements as a central air conditioning plant, the apparatus is smaller and has, of course, limited capacity, but has the advantage that it can be easily fitted anywhere in the mill, suspended on the ceiling, or on brackets on the outside wall, etc. By means of short air ducts with special air diffusers conditioned air can be blown into the required space, and air conditions, i.e., air temperature and relative humidity, can thus be influenced and improved. It seems highly desirable that the progressive miller knows about the existence of unit air conditioners for such auxiliary services.

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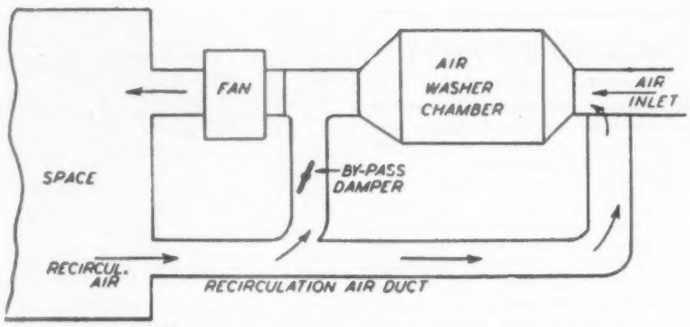

FIG. 3—Central air conditioning plant with by-pass air duct.

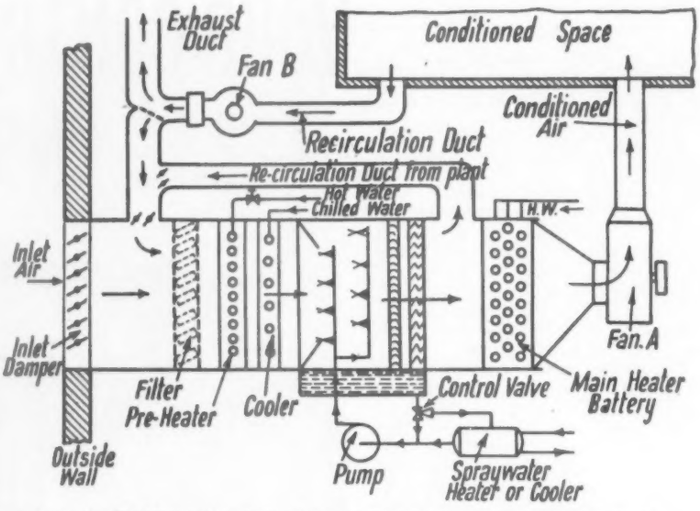

FIG. 4—Elaborate diagram of air treatment with recirculation of air.

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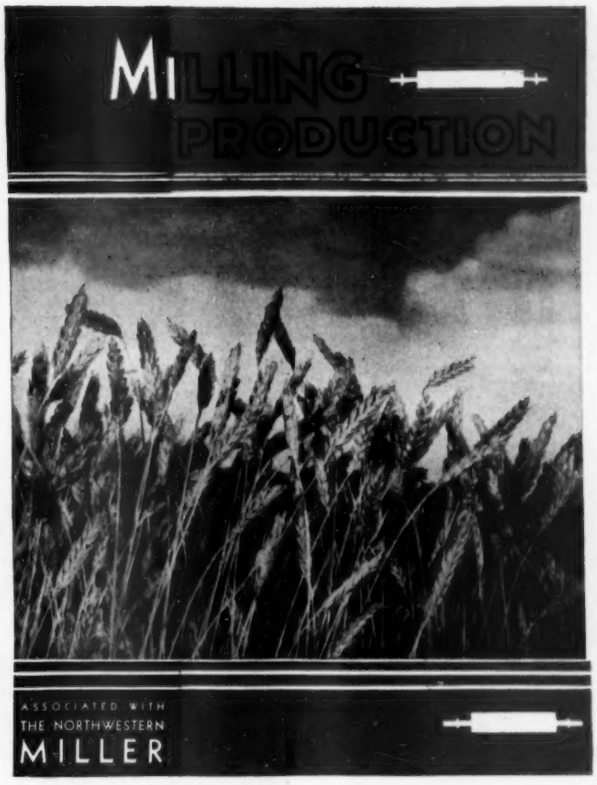

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1. WORKING CIRCULATION —Studies of flour manufacture show that 320 of the flour mills in this country produce 98% of the flour. Milling Production with its controlled circulation reaches more than 900 key men in these important flour mills. This working circulation provides contact each month with the people who directly or indirectly control the buying—superintendents, operative millers, chemists and plant managers. *There is no waste circulation—only working circulation*—and you are assured of reaching your potential customers in the most productive mills.

2. LEADERSHIP MAKES READERSHIP — Readership surveys and unsolicited correspondence from its readers attest to the editorial leadership of Milling Production. That editorial leadership is held by complete words-and-pictures reports of the latest milling technology, current news, features and complete coverage of the activities of the industry's two technical associations. *The real price the reader of a publication pays is the amount of time he puts in reading that journal.* Over one half of the readers of Milling Production have requested that it be sent to their homes so that they may enjoy uninterrupted reading pleasure.

3. DOUBLE-DUTY DOLLARS —Money spent for advertising in Milling Production does double duty. In addition to reaching the production personnel, the advertiser's message is read in the Milling Production Section of The Northwestern Miller by the executives who approve purchase orders. *No other advertising medium in the flour milling industry offers this double-duty feature of reaching both groups*—mill technologists and executives—with the same advertising message and for the cost of one advertisement. Take advantage of this 100% coverage through one double-duty advertising contract.

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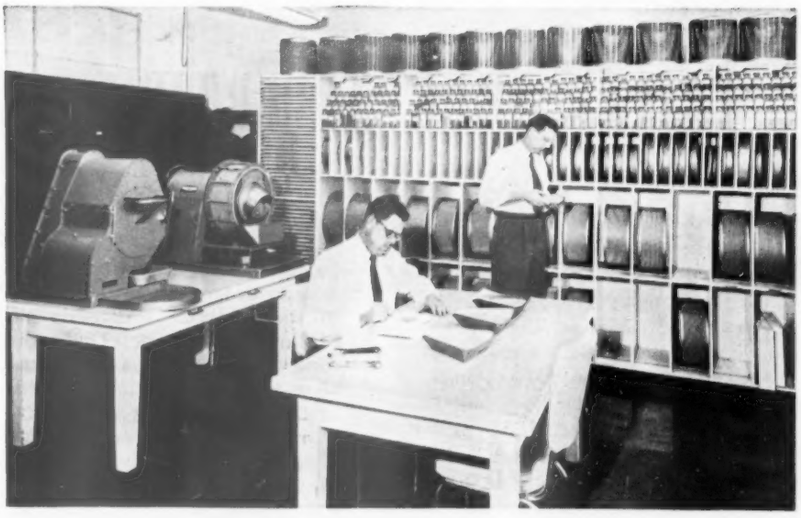
Hart-Carter's well-equipped laboratory can serve you in two important ways: (1) Help you solve your sizing and separating problems; (2) Help you select the machines that will do the best job on your materials.

Send in samples of your grain, seed, or other granular material for *free* testing . . . today. A two-quart sample usually is sufficient to provide a satisfactory test.

A brief description of your operation, including volumes handled, will be helpful.



HART-CARTER COMPANY

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The Hart Uni-Flow laboratory model (far left) is used for tests of length sizing and separating.

The Carter Precision Grader laboratory model (center) is used for either thickness or width sizing.

The Carter Disc Separator laboratory model (right) is used to determine the equipment required for precise length sizing or separating.